

From Cocoon to Cloth



Part of the grove of hybrid mulberry-orange food trees for the silkworm, on the farm near New Orleans. Note the size of the leaves held by the boy and men in the picture.

Silk, in all colors, direct from the worm, without the interference of dyes, chemicals or other manufactured aids, is being produced at New Orleans, where the largest silk farm in the United States at super-silkworm has been developed, nearly twice the size of the ordinary worm of other silk-producing countries, a worm which produces 1,800 yards of silk to the cocoon, as compared with 1,000 to 1,200 yards, the best previous production.

These discoveries are the result of ten years' experiments, made by Dr. Vartan K. Osgian, a native of Harput, Turkey, a son of a family which has been breeding silkworms for more than seven centuries, and who is now an American citizen. At first much doubt and scepticism met the announcement of the discovery of the method of quantitative and qualitative feeding by which Dr. Osgian claimed to have produced the colored silks direct from the worm, and it was not until the Department of Commerce of the United States sent Daniel Waters, one of its trade commissioners, to investigate Dr. Osgian's announcement that the discovery became officially established as a fact.

Mr. Waters remained two weeks at the silk farm at New Orleans, and on the eighteenth of August of this year, rendered a report to the Department of Commerce in which he said in part: "The latest silk farm in the United States was visited by me and I inspected not only the growing trees, but the worms in their various stages, the cocoons and the weaving of the silk. The production of worms which actually will spin color in eighteen different colors is a scientific achievement which may revolutionize the industry. Considered as such, this farm is a Mrs. Olivia Blanchard who has been engaged in Federal work for a quarter of a century, and who is now making thorough research in sericulture. She has books just out at the beginning of the nineteenth century, which say that silk production in Vietnam, Siam, Malacca and other southern states was of considerable importance at that time. From all I can learn from these and other reliable sources, this silk now being produced at New Orleans is superior to the imported article."

The secret of the colored silk is in the feeding, and this is not being revealed, though efforts are now being made to have the Department of Commerce take hold of the discovery and encourage the silk-producing industry throughout the southern states.

The super-silkworm is the result of feeding on the leaves of a new tree, also the creation of Dr. Osgian, through the grafting of mulberry cuttings on orange-orange roots, producing a large, flesher body, with greater food value to the worms. There is no secret as to the character of the tree, or the cause of the greater size of the worms, but the result is a worm from each of these super-worms, containing from 50 to 80 per cent more silk than any cocoons ever previously produced.

The New Orleans farm contains 2,500,000 of the new mulberry-orange-orange trees, with land on which 10,000,000 more are being planted as rapidly as they can be grown and grafted. William Eidenborn, a New Orleans capitalist, owner of the Louisiana Railway and Navigation Company Railroad and of several business holdings, advanced the funds whereby the farm was started. In the refrigerators of the silk-house are 1,000,000 eggs of the silk moth, which are kept in cold storage, retaining life indefinitely, until needed, when they are exposed to the heat of the ordinary summer day in Louisiana, from 75 to 85 degrees, when they begin to hatch in three days, continuing the hatching process for three or four days longer, by which time all the worms are out.

When the hatching is completed, the worms are placed on trays, three inches deep and fifteen inches square, lined with the large leaves of the new mulberry trees. The first thing the worm develops is an astonishing appetite. If man were possessed of a silk worm appetite in proportion to his size, the world soon would be a barren desert. These little worms eat for five days and nights, without ceasing, and then sleep from 18 to 24 hours. Waking from this, their first

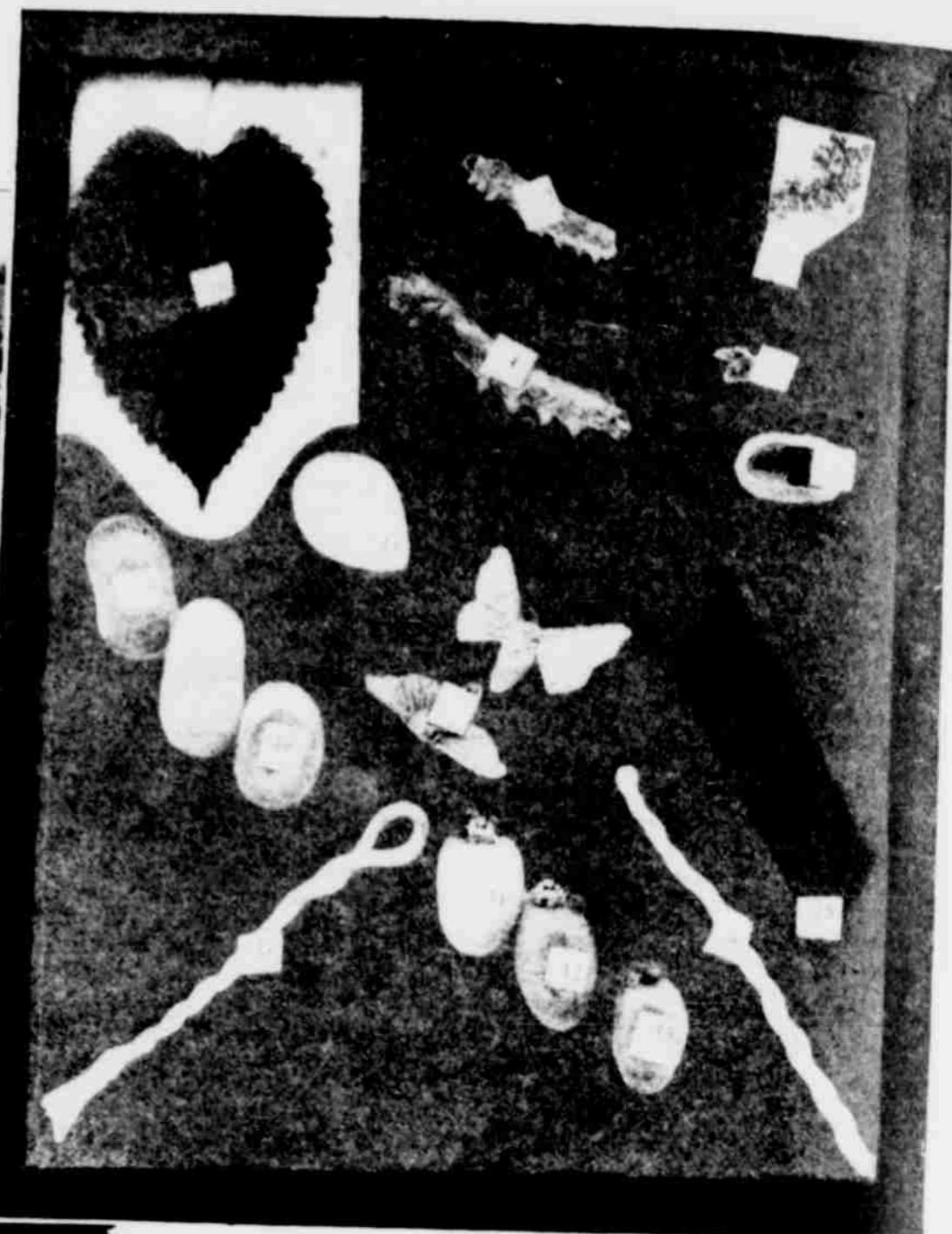


Above DR. VARTAN K. OSIGIAN
Below—Sorting and threading the cocoons.

stage, they shed their skins, and continue this process of eating, sleeping and shedding for 17 days. During the last seven days, the sleep period is eliminated, and the worm again eats constantly, day and night. It is in this feeding that the worm is made to produce the colored silks, but whether it is from the age of the leaves, mixed with the leaves, the discoverer of the system will not reveal.

On the twenty-fifth day of its short life, the worm starts to spin its cocoon. The liquid silk is given off through two glands which traverse the length of the body, with an opening on either side of the mouth. With two projections, one on each side of the mouth, the worm twists these two tiny streams of liquid silk into the fiber which it winds into a shroud about its own body. This is what man wants from the worm, and now he is getting it, not pure silvery white, as always before, but of red, black, orange, purple, green, blue, in short all the rage of eighteen colors ready to be spun into thread without having to be passed through the dye bats, and without danger of rotting from the effect of the chemicals in our time too certain dyes.

Here, after the worm has sealed himself in his silken winding sheet, man intercesses. If the moth were permitted to devolve, it would moisten the end of the cocoon so that it could force the strands apart and escape. This would scatter the strands, and make weak spots in the fiber. Therefore, as soon as the cocoon is completed, carbon bisulphide is passed through it,



Epochs in the life of the silkworm and moth, which lives about 27 days as a worm, and three days as a moth. (1) eggs of the silk moth; (2) the ordinary silkworm; (3) magnified spinnerets at the mouth of the silkworm; (4) the super-silkworm, produced by Dr. Osgian and nearly twice as large as the ordinary worm; (5) empty cocoon of the ordinary silkworm; (6 and 7) silk moths; (8, 9 and 10) completed cocoons, black, white and orange, of the silkworm which produces the colored silk; (11, 12 and 13) worm closing itself into cocoon; (14) magnified egg of silk moth; (15) black cloth woven from black silk produced direct from cocoon without dyeing; (16 and 17) silk spun from cocoons; (18) leaf of new hybrid mulberry-orange tree, on which silkworm is fed.

and the worm killed painlessly, some of the larger and best-shaped cocoons being left for the production of moths for breeding stock.

Then, as soon as the worm is dead, the cocoons are floated on a pan of water, a whisk broom being lightly over them to which the ends of the stems from each cocoon adheres, and then the fiber is drawn off on to spindles, to be spun later into the thread, or the silk cloth of commerce. This is all there is to it; direct from the worm to the bolt of cloth of whatever color is desired.

The moths themselves, those that are used to lay the millions of eggs from which the life is to come, have become virtually useless through centuries of care at the hands of man. They have wings, but they cannot fly, live for long periods, and mouths so weak that they cannot eat. The one and only purpose of life, of three days, is to reproduce itself, and these three days are given over to breeding and the laying of eggs, of which each female lays only about 800, as compared with the thousands of eggs laid by some of the common wild moths and butterflies. The eggs are gathered and carefully examined under the microscope, the fertile ones put away in cold storage until such time as more worms are needed.

Something of the value which would be turned to home production if the Federal government takes over supervision of silk production in the United States, or, at least, gives it educational support, may be gleaned from the fact that this country last year alone imported more than \$400,000,000 worth of silk. Another product of the silkworm which is actually worth

more than the silk in each cocoon, is the intestine of the worm, used in the most delicate of surgery, and in the manufacture of certain optical, engineering and seismographic instruments. Each worm produces about 24 cents worth of this fine "gut," about 6 cents more than its cocoon of raw silk fiber is worth. The demand for the internal by-product, however, is much less than that for the silk.

Foreign countries produce on the average of one crop of silkworms each year, sometimes, in favored localities, two. Here in the southern United States eight crops have been produced, with an average of 1,500 yards of fiber in the cocoon of each—a total of 12,000 yards of these delicate strands, color to suit a year-worm. About 100,000 worms can be handled by one person, if he have plenty of food trees and the proper sets of trays and other equipment for the purpose. Twenty acres of land is required for a farm of this size.

The history of silk dates back to the somewhat mythical Sie Lang Chi, queen of China, twenty centuries before the birth of Christ. Her Majesty is said to have found some cocoons of the silkworm, and conceived the idea of having them woven into a gown. The result was so pleasing that the queen established the industry, and, for centuries, the Chinese silk-makers guarded it as a secret from the whole world. King Levon, of Armenia, sent two priests into China, who brought away mulberry seeds and silkworm moth eggs. The culture soon spread to Syria, Persia, India and other Oriental countries, and eventually to France and Italy.